Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL110 Gen10 Plus
(2.40 GHz, Intel Xeon Silver 4314)

Specspeed®2017_fp_base = 91.8
Specspeed®2017_fp_peak = 93.6

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Threads

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<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (91.8)</th>
<th>SPECspeed®2017_fp_peak (93.6)</th>
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<tr>
<td>603.bwaves_s</td>
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<td>64.3</td>
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<td>628.pop2_s</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
<td>90.4</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Silver 4314
Max MHz: 3400
Nominal: 2400
Enabled: 16 cores, 1 chip
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I-D on chip per core
L3: 24 MB I+D on chip per chip
Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage: 1 x 480 GB NVMe SSD, RAID 0
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
Kernel 4.18.0-240.el8.x86_64
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
Compiler Build 20201113 for Linux;
Fortran: Version 2021.1 of Intel Fortran Compiler
Classic Build 20201112 for Linux;
C/C++: Version 2021.1 of Intel C/C++ Compiler
Classic Build 20201112 for Linux
Parallel: Yes
Firmware: HPE BIOS Version U56 v1.50 05/13/2021 released May-2021
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS set to prefer performance at the cost of additional power usage
### Results Table

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<th>Ratio</th>
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</tr>
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**SPECspeed®2017_fp_base = 91.8**

**SPECspeed®2017_fp_peak = 93.6**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Operating System Notes

- Stack size set to unlimited using "ulimit -s unlimited"
- Transparent Huge Pages enabled by default
- Prior to runcpu invocation
- Filesystem page cache synced and cleared with:
  ```
  sync; echo 3>       /proc/sys/vm/drop_caches
  ```

### Environment Variables Notes

- Environment variables set by runcpu before the start of the run:
  ```
  KMP_AFFINITY = "granularity=fine,compact"
  LD_LIBRARY_PATH = "/cpu2017/lib/intel64:/cpu2017/je5.0.1-64"
  MALLOC_CONF = "retain:true"
  OMP_STACKSIZE = "192M"
  ```

### General Notes

- Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
- NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
- Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
- Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.
- jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
### SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**
*(Test Sponsor: HPE)*

**ProLiant DL110 Gen10 Plus**
*(2.40 GHz, Intel Xeon Silver 4314)*

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<td>93.6</td>
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---

**CPU2017 License:** 3  
**Test Date:**  Jun-2021  
**Test Sponsor:** HPE  
**Hardware Availability:** Jun-2021  
**Tested by:** HPE  
**Software Availability:** Jun-2021

---

### General Notes (Continued)


Submitted_by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>  
Submitted: Mon Jun 21 10:34:24 EDT 2021  
Submission: cpu2017-20210621-27591.sub

---

### Platform Notes

The system ROM used for this result contains Intel microcode version 0xd0002a0 for the Intel Xeon Silver 4314 processor  
**BIOS Configuration:**
- Workload Profile set to General Peak Frequency Compute  
- Intel Hyper-Threaded set to Disabled  
- Thermal Configuration set to Maximum Cooling  
- Memory Patrol Scrubbing set to Disabled  
- Advanced Memory Protection set to Advanced ECC  
- Last Level Cache (LLC) Prefetch set to Enabled  
- Last Level Cache (LLC) Dead Line Allocation set to Disabled  
- Enhanced Processor Performance set to Enabled  
- Workload Profile set to Custom  
  - Energy/Performance Bias set to Balanced Power  
  - DCU Stream Prefetcher set to Disabled  
  - Adjacent Sector Prefetch set to Disabled  
  - Minimum Processor Idle Power Package C-State set to No Package State  
  - Numa Group Size Optimization set to Flat

Sysinfo program /cpu2017/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d  
running on localhost.localdomain Tue Jun 15 10:32:00 2021

SUT (System Under Test) info as seen by some common utilities.  
For more information on this section, see  
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo  
- model name : Intel(R) Xeon(R) Silver 4314 CPU @ 2.40GHz  
  1 "physical id"s (chips)  
  16 "processors"  
- cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)  
  cpu cores : 16  
  siblings : 16  
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu from util-linux 2.32.1:  
- Architecture: x86_64

---

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL110 Gen10 Plus
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SPECspeed®2017_fp_base = 91.8
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Silver 4314 CPU @ 2.40GHz
Stepping: 6
CPU MHz: 2705.414
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 24576K
NUMA node 0 CPU(s): 0-15

Flags:

/proc/cpuinfo cache data
cache size: 24576 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 501377 MB
node 0 free: 507507 MB
node distances:
node 0
0: 10

(Continued on next page)
Platform Notes (Continued)

From /proc/meminfo
MemTotal: 528055448 kB
 HugePages_Total: 0
 Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release* /etc/*version*
o-release:
 NAME="Red Hat Enterprise Linux"
 VERSION="8.3 (Ootpa)"
 ID="rhel"
 ID_LIKE="fedora"
 VERSION_ID="8.3"
 PLATFORM_ID="platform:el8"
 PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
 ANSI_COLOR="0;31"
 redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
 system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
 system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store
 Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps
 barriers and __user pointer
 sanitation
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB:
 conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jun 15 06:11

SPEC is set to: /cpu2017

(Continued on next page)
Hewlett Packard Enterprise
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ProLiant DL110 Gen10 Plus
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Platform Notes (Continued)

Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/nvme1n1p4  xfs  442G  144G  298G  33%  /

From /sys/devices/virtual/dmi/id
Vendor:       HPE
Product:      ProLiant DL110 Gen10 Plus
Product Family: ProLiant
Serial:       T912PP0032

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
8x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666

BIOS:
BIOS Vendor:  HPE
BIOS Version: U56
BIOS Date:    05/13/2021
BIOS Revision: 1.50
Firmware Revision: 2.40

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base)
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
C               | 644.nab_s(peak)
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
(Continued on next page)
## SPEC CPU® 2017 Floating Point Speed Result

### Hewlett Packard Enterprise

**Test Sponsor:** HPE  
**ProLiant DL110 Gen10 Plus**  
(2.40 GHz, Intel Xeon Silver 4314)

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<th>Test Sponsor:</th>
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<th>Tested by:</th>
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<th>Software Availability:</th>
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### SPECspeed® 2017 fp_base = 91.8  
### SPECspeed® 2017 fp_peak = 93.6

### Compiler Version Notes (Continued)

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Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |

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<th>644.nab_s(peak)</th>
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| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |

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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
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SPECspeed®2017_fp_base = 91.8
SPECspeed®2017_fp_peak = 93.6

Compiler Version Notes (Continued)
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Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
-no-prec-div -qopt-prefetch -ffinite-math-only

(Continued on next page)
Hewlett Packard Enterprise  
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CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE

**Base Optimization Flags (Continued)**

Fortran benchmarks (continued):
- `qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs`
- `mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib`
- `ljemalloc`

Benchmarks using both Fortran and C:
- `-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp`
- `-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Benchmarks using Fortran, C, and C++:
- `-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp`
- `-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

**Peak Compiler Invocation**

C benchmarks (except as noted below):
- `icc`
  
  `644.nab_s: icx`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `ifort icc`

Benchmarks using Fortran, C, and C++:
- `icpc icc ifort`

**Peak Portability Flags**

Same as Base Portability Flags
Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes


Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass1) -prof-use(pass2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactusBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revC.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revC.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
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Test Sponsor: HPE  
Tested by: HPE | Test Date: Jun-2021  
Hardware Availability: Jun-2021  
Software Availability: Jun-2021 |

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Tested with SPEC CPU®2017 v1.1.8 on 2021-06-15 11:32:00-0400.  
Report generated on 2021-07-06 18:43:19 by CPU2017 PDF formatter v6442.  
Originally published on 2021-07-06.